

BROADBAND ACCESS AND CIVIC ENGAGEMENT: HOW DIFFERENT SOURCES OF
CONNECTIVITY IMPACT COMMUNITY INVOLVEMENT

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Master of Public Policy
in Public Policy

By

Erica Fox, BA

Washington, DC
April 10, 2015

Copyright 2015 by Erica Fox
All Rights Reserved

BROADBAND ACCESS AND CIVIC ENGAGEMENT: HOW DIFFERENT SOURCES OF CONNECTIVITY IMPACT COMMUNITY INVOLVEMENT

Erica Fox, BA

Thesis Advisor: William E. Encinosa, Ph.D.

ABSTRACT

In recent years, the Internet has been transformed from a niche form of entertainment to an educational tool, a driver of economic growth, and an engine of innovation. Access to high-speed Internet is so highly-prized that the FCC received over 4 million individual comments in support of the principles of Net Neutrality. Businesses, schools, and governments rely on Internet access for their most basic functions, and consumers demand ever greater bandwidth. This study examines whether access to high-speed broadband in any form is associated with the increased likelihood of citizens investing in their communities and engaging in civic life. While previous literature has explored the relationships between fixed-connection broadband access and voting, this study includes mobile broadband access as a comparison, and tests new proxies for civic engagement. Through a quantitative study of data from the FCC's Form 477 and Internet Access Service Report, the American National Election Study, and the Area Health Resource File, this study found positive relationships between access to fixed-connection broadband and civic engagement, as well as positive relationships between mobile broadband and civic engagement. The relationships appear to be stronger for fixed-connection broadband than mobile, suggesting that access is not the only consideration when encouraging civic participation. These findings suggest that government support for increased access to high-speed broadband would be warranted. But they also suggest that citizens might be best served if that access were coupled

with programming aimed at closing digital divide, allowing underserved communities ways to invest and engage with their neighbors and local institutions.

To my unflappable parents, my most reliable proofreader Amelia, Alexis, Kim, and the many generous colleagues who offered input and support along the way.

Many thanks,
Erica E. Fox

TABLE OF CONTENTS

Introduction.....	1
Institutional Background.....	4
Literature Review.....	5
Conceptual Model.....	12
Data and Variables.....	14
Methodology.....	20
Results.....	22
Policy Implications and Conclusions.....	30
Bibliography	38

TABLE OF FIGURES

Figure 1: Determinants of Civic Engagement	13
Figure 2: Summary Statistics	19
Figure 3: Variable Descriptions and Values	19
Figure 4: Estimates of Probabilities in the Fixed-Connection Model.....	27
Figure 5: Estimates of Probabilities in the Mobile Model.....	28
Figure 6: Distribution of Fixed-Connection Broadband by State.....	36
Figure 7: Mobile Broadband Subscriptions by State	37

INTRODUCTION

There is a classic generational divide at play in most discussions of effects of the proliferation of high-speed Internet on contemporary society. One generation argues that it is another distraction, the cause of fragmented attention spans and disconnected youths. The other sees the promise in a new vehicle for information and education, arguing that the Internet is a tool that will allow communities to innovative new ways to level the playing field, and create a more representative democracy. This study seeks to investigate the relationship between access to high-speed Internet and civic engagement. It contributes to the literature in this field by expanding the scope beyond fixed-connection broadband, to consider whether mobile broadband has similar effects, or whether the manner in which they are used is inherently different.

Internet access has been associated with economic growth for more than a decade, with studies demonstrating the positive effects Internet access has on reducing overhead, facilitating supply-chain connections, and opening up new markets. (Litan & Rivlin, 2001) As the technology facilitating those connections has developed, we have seen that faster and easier access to Internet (broadband instead of dial-up) is associated with wider use of the Internet for a greater variety of purposes. (Madden & Rainie, 2003)

The Internet has become such a ubiquitous tool in everyday American life that supporters of net neutrality often frame Internet access as a positive right, on par with the right to education or healthcare. The FCC's recently released Net Neutrality rule adopts this perspective, choosing to regulate the Internet as a public utility (under Title II of the Communications Act of 1934). The foundation of the argument made by the Chairman of the FCC is that the Internet is a tool, one that improves daily life, government transparency, and business environments. Advocates for

using Title II to protect net neutrality claim that the Internet is now so central to everyday life that Internet service providers should have no authority to act as gatekeepers, no opportunity to incorporate varied speeds into different services as part of their business model. They argue that regulation by the FCC as a utility will help to keep the Internet a democratic medium.

Despite figures like the President, the Chairman of the FCC, tech CEOs, and the Democratic leaders of the House and Senate making arguments for the essential nature of the Internet, in the vast majority of cases access to the Internet is still determined by the open market. This market often lacks serious competition, leaving some communities and some groups seriously underserved. Many rural municipalities are not seeing the same investments in communications infrastructure as their urban counterparts, finding themselves increasingly neglected by telecom companies. Companies have been reluctant to invest in the infrastructure necessary to furnish “last mile connections” because of the considerably lower return they see on these investments than they see in a more densely populated or wealthy area. As some of these municipalities consider different options to build their own infrastructure, local legislators are seeking solutions to this problem. Publicly subsidized broadband and public private partnerships are two possible strategies for building out the infrastructure. In order to argue that the government should get involved and potentially subsidize connecting infrastructure or services for low income and rural residents, one must make the case that the Internet contributes to the public good. This brings up two important policy questions:

First, does the presence of broadband Internet indeed increase levels of civic engagement?

Second, does mobile broadband have a similar effect on civic engagement, or does it have a lesser impact?

The hypotheses that I propose to test in reference to these two questions are:

Access to broadband Internet at speeds of at least 200kbps increases levels of civic engagement

Access to mobile broadband does not significantly increase civic engagement to the same degree as a fixed Internet connection does.

This paper seeks to answer these hypotheses, while also examining the potential implications for future policy-making. If this study shows that mobile broadband access appears to have a lesser effect on civic engagement, can policymakers be convinced of arguments that the two are interchangeable? When providers argue that their business model doesn't support extending connections to rural areas or reducing prices for poor subscribers, policymakers must consider whether mobile broadband is actually the next best thing. Moreover, those working to encourage civic engagement should consider whether to employ more active programming to encourage civic engagement through use of mobile devices, taking cues from well-documented successes of programs in developing nations.

INSTITUTIONAL BACKGROUND

The federal government signaled the importance of broadband Internet access to its vision of a connected, modern United States when it created the “National Broadband Plan” in 2010. This plan details the many potential benefits of broadband Internet, including possible improvements for government transparency as well as assumed attendant increases in civic engagement. (FCC, 2011) Access to broadband Internet has been determined to be so important to education that the FCC developed a new project in 1996 dedicated to connecting the nation’s schools and libraries to the Internet. E-Rate is now the government’s largest program dedicated to technology in education, having already been implemented in 100,000 schools across the US, increasing Internet access in public schools by 60% by 2005. (CRS, 2001) The program’s success inspired the FCC in 2014 to announce a plan to increase the program’s annual spending cap from \$2.4 billion to \$3.9 billion, in part to pay for the costly upgrades to broadband for schools with slower connections. (Brodkin, 2014)

The federal government also offers a series of small grants dedicated to connecting communities to the Internet, including a portion of the funds associated with the American Recovery and Reinvestment Act, as well as grants disbursed by the Broadband Technology Opportunity Program. These have been utilized by parties engaging in public private partnerships to develop their own broadband infrastructure in rural areas; including a project in Southeastern New Hampshire and two projects in Virginia. Each project has relied on private matching funds and private operators to step in in the place of telecoms, building and managing the infrastructure, and creating an open access network. These networks in turn have attracted a variety of small-scale Internet service providers, but few programmatic copycats.

LITERATURE REVIEW

This study explores the rich body of scholarship dedicated to examining the causes of civic engagement, the importance of civic participation to democracy, and the effect Internet access has on this type of engagement. This study will also examine the importance of perception in driving civic participation, the foundational elements of social capital, and the significance of demographic factors that appear to correlate with access to broadband. As previously discussed, uncovering the levers that affect civic engagement is important both for parties invested in increasing engagement in their local communities, and also for those invested in maintaining the strength of a democracy. Seeking new ways to engage new generations in their civic duties is essential work, and this study seeks information on how connectivity fits into the picture.

Most of the literature on contemporary understandings of civic engagement organizes itself around the American Psychological Association's definition of civic engagement, which is "individual and collective actions designed to identify and address issues of public concern." (American Psychological Association n.d.) The APA definition goes on to enumerate a few of those actions, which include volunteerism, voting, or a variety of organizational memberships. The Pew Internet and American Life Project divides these volunteer and organizational activities into four distinct categories, ultimately allowing that people have participated in a civic engagement activity if they participated in a single activity in one of the four categories. The categories were divided as follows: Category 1: Real world action. This could entail attending a political event, working for a party or a candidate, attending a protest, or working with fellow citizens to solve a problem in their community. Category 2: Connecting with the government in the real world to solve a problem. This could entail contacting an official

or speaking out in a public forum on political or policy issues. Category 3: Connecting with the government online. This would entail doing the same activities as the previous category, but online. Category 4: Engaging in political or civic activities on social networking sites. (Smith, 2013)

The US has seen a steep decline in engagement in activities in the past 50 years, and there is considerable literature dedicated to why the decline in civic engagement is important. Jennings and Stoker make the point in their seminal paper on the topic that social trust is central to community cohesion and cooperation. They claim that a community filled with happy people who trust each other is more likely to have success working together to solve collective problems, and that participation in the activities in our four civic engagement categories are key to developing this social trust. There is also evidence that communities with high levels of civic engagement have lower unemployment rates, among other positive economic indicators. (NCOC Issue Brief, 2011) And most importantly, studies have seen that social capital, defined by Paxton as the connections formed through working together towards common goals (produced by engagement in activities in our four categories) correlates with the strength of a democracy. When a country has a highly engaged citizenry, it is more likely to sustain a democracy. (Paxton, 2002) Paxton's explanation for this correlation uses some of the reasoning this study will employ – that a highly engaged citizenry leads to the sharing of information, which leads to accountability for governments.

A good portion of the literature on civic engagement is dedicated to determining the “causes” of civic engagement. A popular topic is the relationship between church attendance and civic engagement. Kraig Beyerlein demonstrated in his 2006 study that there is a strong relationship

between church attendance and engagement in other community activities – particularly engagement with charitable and civic organizations, though his research does show that this effect is lessened significantly for evangelicals. (Beyerlein, 2006) Constance Flanagan makes claims in her work on the developmental nature of civic engagement that involvement with religious groups as a young person helps to develop a sense of collective identity, which leads to a lifelong interest in community membership. (Flanagan, 2003) Corwin Smidt goes further to posit that church attendance might impart some of the organizational and negotiating skills that are subsequently used in civic life. (Smidt, 1999)

Studies looking at the effect of higher education on civic engagement show that more education is associated with increases in civic engagement. Sunshine Hillygus dug deeper to examine which factors in a person's education were more likely to correlate with increased civic engagement, and found that SAT scores and college curriculum were the factors most strongly associated with increases in civic engagement. Specifically, the more social science courses a student took, the more likely they were to be civically engaged in the years after college. This implies that exposure to social concerns and sustained engagement with information about the political system tends to be associated with higher levels of future involvement. (Hillygus, 2005)

Lastly, any discussion of civic engagement should reference the rich collection of studies focusing on social capital. Robert Putnam's examination of the decline of social capital in the US over the past 20 years sits squarely at the center of this body of work. He defines social capital as "features of social life –networks, norms, and trust – that enable participants to act together more effectively to pursue shared objectives." (Putnam, 1995) If this study defines civic engagement as the process of working individually or in groups towards particular social objectives, it must

consider social capital as an essential ingredient in the ability to form these groups. Putnam makes the point that social capital and civic engagement have eroded simultaneously in the US in recent years. Other scholars argue that civic engagement and social capital are part of a virtuous circle – that as one becomes involved in more civic organizations and does more volunteer work, one develops more social capital. The theory is that these activities foster more trust and confidence in others, both for the volunteer and their fellow community-members. This in turn, strengthens the ability of these community members to take collective action. (Jennings & Stoker, 2004) Kwak and Shah have dug deeper to examine the relationship between social associations and social trust and the increased likelihood of people becoming civic participants if they hold trusting attitudes towards others. (Kwak, Shah, D.V., and Holbert, 2004)

The relationship between Internet access and civic engagement has been explored from a number of different angles, with scholars coming to sharply different conclusions. There is nearly universal agreement on one thing: that the Internet can expose people to a greater variety of viewpoints, with the potential to expand their knowledge with respect to important issues in their communities. There are two distinct schools of thought on what happens next. The first is that, armed with more information, people become more interested and equipped to engage with their communities. This is called the amplification model. Agre is a proponent of this school of thought – though with a caveat. Agre believes that the Internet is a passive resource, doing nothing on its own, but that institutions use the Internet to organize their natural constituencies, and are able to mobilize that technology to amplify work that has been ongoing. (Agre, 2002) The second school of thought on the impact of technology on civic engagement is called the reinforcement model. It proposes that, given the choice of whether to engage in a wider range of

opinions or to dig deeper into one's own viewpoint, people will choose the latter. This school of thought is most vociferously championed by Cass Sunstein, in his *Republic.com* and Eli Pariser in his *Filter Bubble*. Both authors have grown increasingly concerned with the idea that the Internet allows people to choose the information to which they are exposed in an unprecedented way. Sunstein goes even further; to posit that given the option, the vast majority of people will choose to engage with information that reinforces their existing views of the world, rather than investigating contrary perspectives. There are some who believe that this leads to entrenchment, showing very few of the positive effects on civic engagement that can be seen from increased access to information. One challenge for any study is to determine whether the amplification effect can outweigh the reinforcement effect, or whether they cancel each other out.

In addition to studies examining how access to Internet affects the behavior of citizens, there have been studies examining citizens' perceptions of how the Internet is affecting them and their relationships to government. Most notably, the Annenberg Digital Future Project asked users whether they believed the Internet was important to the political process. While a majority of users (60%) said they believed that the Internet was important to the political process, only a minority said that they believed the Internet could give users more say in what the government does. The percentage of users who believe that the Internet could give them political power has declined in recent years, with 33% believing this in 2012, down from a high of 40% in 2005. (The Digital Future Report, 2012)

As this study considers the effect that access to broadband might have on communities, it is worth noting the considerable scholarship dedicated to examining the factors that might affect access to broadband, commonly referred to as the "digital divide." The factor that seems to have

the greatest impact on the likelihood of having access to broadband Internet is income level. The Annenberg Digital Future Project has repeatedly shown a strong correlation between income level and Internet access. Their 2013 report shows that while few people claim that the cost of Internet access is what keeps them offline, a relationship between Internet use and income was found in every year studied. While 97% of households with income at \$100,000 or above report using the Internet, only 66% of respondents with household income less than \$30,000 report using the Internet. (The Digital Future Report, 2013) The strength of this disparity argues its importance, particularly in light of other factors that correlate with income.

Some of the other factors expected to correlate with income when it comes to increased access to information and a tendency toward civic engagement might be race, gender, age, and educational attainment. The Pew Center's Internet Project has dedicated years of research to exploring who does not have access to Internet and why. They report strong correlations between use and age, educational attainment and household income. The strongest correlation they note is with age, with 44% of Americans 65 and older not using the Internet. And these older Americans make up 49% of total non-users. The Pew report also shows significant but somewhat expected trends in access and educational attainment. Among people with no high school diploma, 41% do not go online, whereas 22% of high school graduates do not go online, and only 4% of people with a college degree do not go online. The study also shows that groups more likely to rely on Internet access outside the home include Blacks and Hispanics, and that women are slightly less likely to use the Internet than men. (Zickuhr, 2013) The National Telecommunications Industry Association's annual report on the state of the Internet considers disability status, determining that, once controlling for other factors including age, race, and income, disabled people are still

6% less likely to use the Internet. (NTIA, 2011). Some are concerned that the digital divide is growing more entrenched, resulting in a permanent segment of the population staying offline.

Another disparity is seen in the divide between people with broadband connections and those using dial-up Internet. Pew reports that the experience of Internet users and the quality of the connections they use matter, and that these factors affect the type of information that people seek, and the work they do while online. (Madden & Rainie, 2003) Those with better connections are more likely to go online more often, and are more likely to use the Internet for longer periods, acquiring more information in that time.

If it is to be believed that there is a correlation between Internet use and civic engagement, then who has access to the Internet, and access to easy-to-use Internet, matters enormously. In a democratic system, it is well understood that politicians and bureaucrats select policy paths based on feedback from constituents. This study can reasonably assume that constituents who interact more with their representatives will be more likely to have their views represented. Therefore it should be of gravest concern whether there are forces at play in the market keeping certain groups of people from accessing tools that might help them to engage more fully in this process.

Having established a working definition for civic engagement, and a clear understanding of the existing scholarship in the field, this study will also demonstrate how its unique features add to the literature. Because the proliferation of mobile broadband-enabled device is relatively new, little research has been done into what relationship that use has to use of traditional fixed-connection broadband. Even less literature has been dedicated to exploring what effect use of these devices has on community involvement. This study will contrast these two uses to examine what the evolution of connectivity might look like for democracy.

CONCEPTUAL MODEL

This study seeks to explain the effect that access to broadband has on six unique proxies for civic engagement, holding constant a series of relevant demographic characteristics, using regression analysis. In these regressions, the dependent variable is civic engagement, while the independent variables will be either version of access to broadband.

As this study has explained previously, civic engagement will be measured by a number of proxy variables. Two that are suggested from previous literature are voting and church attendance. A few additional measures have been added based on previous analyses, including attending political rallies, volunteering for political campaigns, registering to vote, and donating to political parties or candidates.

There are a number of demographic characteristics that are expected to influence civic engagement, based on previous studies of voting patterns in the United States. Some of those characteristics are educational attainment, income level, race, age range, gender, marital status, employment status, and how much elections make politicians pay attention to the concerns of their constituents.

Analyzing the coefficients on the broadband access terms will allow this study to show the likelihood of citizens participating in a particular engagement activity, as they move up the ladder of connection levels. For Logit regressions, if there were odds ratios equal to 1 or larger, this study could conclude that there was a positive relationship between broadband access and the likelihood of a positive response for the engagement proxy. For OLS regressions, positive coefficients would imply a positive relationship as well.

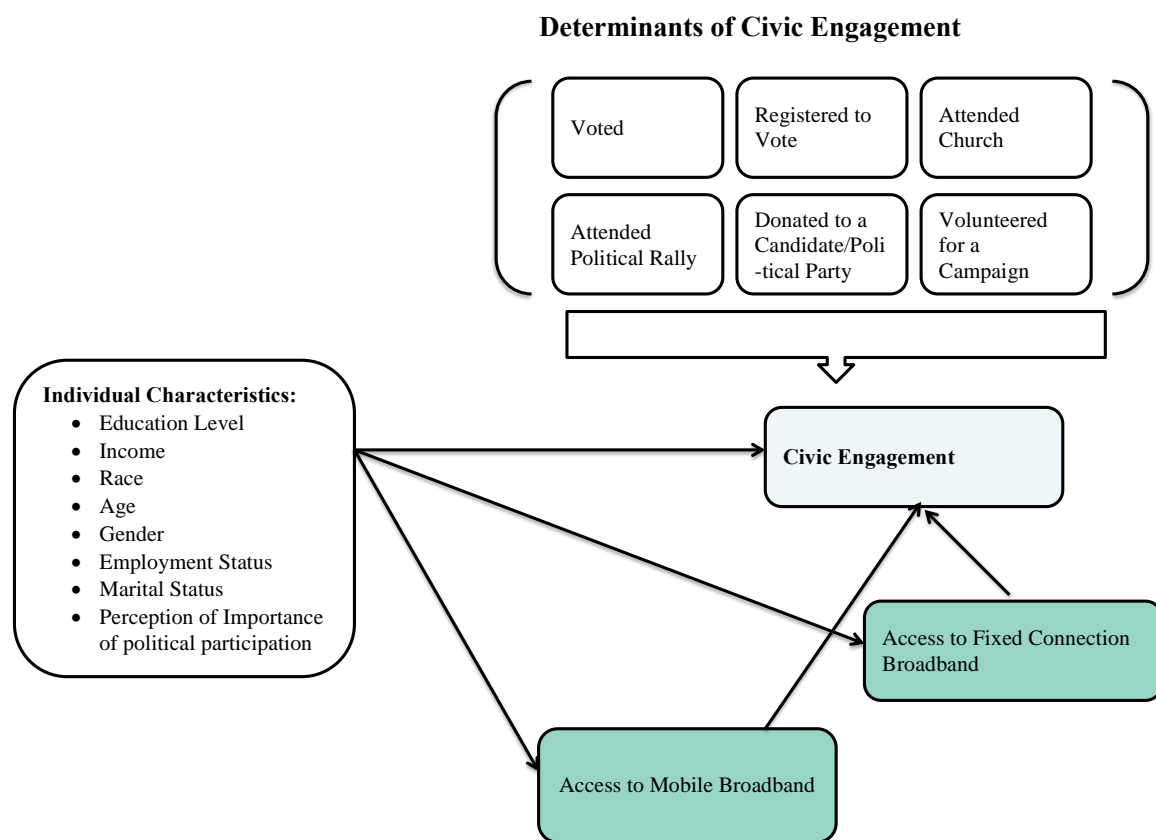


Figure 1: Determinants of Civic Engagement

DATA AND VARIABLES

This paper uses four data sources. The first is a census tract-level breakdown of fixed-connection broadband hookups per 1,000 homes. This data is made publicly available by the FCC, collected as part of an initiative to map Internet access across the United States. The data is submitted by the four different entities required to fill out the FCC's Form 477: "facilities-based providers" of broadband connections to users (libraries, etc.); telecommunication companies providing local wired or wireless exchange services; providers of VoIP service; and mobile phone companies. While the Form 477 collects mobile broadband coverage data at the census block level in the same way that it collects fixed-connection broadband data, it does not collect the number of mobile subscriptions in the coverage area. Instead, this study used the state-level subscription numbers reported in the FCC's annual Internet Access Services report as the second dataset. The third dataset this study deployed was the Area Health Resources File, to fill in demographic data at the county-level. This is a healthcare-focused dataset that draws on data collected annually from over 50 different sources including the Bureau of Labor Statistics, the CDC/National Center for Health Statistics, the Centers for Medicare & Medicaid Services, and the Census Bureau. The fourth and last dataset is the American National Election Studies' (ANES') Evaluations of Government and Society Study, done in 2010-2012. This study is an Internet-based survey, administered over the course of two years, examining American attitudes about government and society in anticipation of the 2012 election.

There were a number of minor concerns with the datasets. While the FCC's Form 477 is considered fairly reliable, critics argue that the standard used to define what constitutes broadband in this dataset is far too low. With a cutoff at 200kbps, the definition of broadband

used in this dataset is about 100 times lower than the new definition proposed by the FCC in early 2015. The FCC chose to inch their standards up considerably in response to consumer pressure and amidst arguments that technology had evolved. (Singleton, 2015) Other concerns with the data include concern about the validity of the ANES data – namely concerns that Internet surveys having the potential to over-sample particular groups. While this study employed weights to control for over-sampling, some of this bias may not have been eliminated by the weights. Since participation is voluntary, the survey may naturally oversample a more engaged and technologically literate population, owing to the fact that it is an online survey covering election issues. Some of this bias is likely to escape careful controls.

Dependent Variables

The first dependent variable of interest is whether or not the respondent attends church. 40% of the sample reported never attending church, while 34% of the sample reported attending church every week or nearly that often. This ordinal variable has six different possible responses, including “never,” “a few times a year,” “once or twice a month,” and “almost every week.”

The second key dependent variable of interest is whether or not respondents attended a political rally or event during the election cycle. This binary variable saw only about 6% of respondents reporting in the affirmative, that is, attending any political activities during that election cycle.

The third key dependent variable of interest is whether respondents had ever volunteered or worked for a party or candidate during the election cycle. This binary variable also had a low positive response, with only 3% of respondents claiming to have volunteered for a candidate or party.

The fourth dependent variable of interest is voter registration. This was unavailable in the dataset independent of voting, so this study used a categorical variable with three possible answers: 1= not registered and didn't vote, 2= registered, but did not vote, 3= voted (registered). Registration was then extrapolated based on the answers, in this study, those coded in the original variable with 1 were considered not registered, and those coded 2 or 3 were considered registered. A full 90% of the sample claimed to be registered to vote.

The fifth dependent variable of interest is the ANES binary dummy indicating whether or not a person voted in the 2012 election. Of the 5,914 respondents in the study, 4,404 reported voting in the 2012 election, or 74% of the sample.

The sixth dependent variable of interest is whether respondents donated money to campaigns or candidates during the particular election cycle. This binary dummy had nearly a 13% affirmative response: that is 13% of respondents from this sample donated to a particular candidate or political party during the campaign.

Independent Variables

The key independent variables of interest are residential fixed high-speed connections over 200 kbps in at least one direction per 1,000 households, and mobile connections over 200 kbps in at least one direction, in thousands. Access to fixed-connection broadband is an ordinal variable, with fixed-connections broken down into 200kbps-connection chunks, with 0=0, 1= connections up to 200, 2= connections between 200 and 400, 3 = connections between 400 and 600, 4= connections between 600 and 800, and 5= connection higher than 800. The largest concentration of values for this variable is between 3 and 4. Because this study was unable to access civic engagement and mobile data at the census tract level, the datasets were merged at the state level.

This meant collapsing these fixed-connection categories to their statewide mean. Resulting fixed-connection values contained decimals, and no longer meaningful categories, so they were then broken into four quartiles, leaving fixed-connection as measured by the top 25% of connectivity, the 50-75th percentile of connectivity, the 52-50th percentile of connectivity, and the bottom 25% of connectivity. The mobile wireless data measures the number of subscriptions to coverage providing over 200 kbps in at least one direction. This variable is continuous, measured in the thousands, but has also been broken into quartiles and terciles for ease of comparison, which were both used in different regressions.

Control Variables

This study also employs a number of control variables from the Area Health Resources File. The first is income, which is ordinal and broken down into five categories. The first category is income between \$0 and \$16,999. The second category is between \$17,000 and \$34,999, with a third category from \$35,000 to \$69,999. The fourth category spans \$70,000 to \$119,999, with the last category encompassing those who earn \$120,000 and above. For ease of comparison, this study broke the income variable into quartiles, so comparisons could be made concerning the effects of the top 25% of earners vs. the bottom 25%, etc.

The next control variable in use is education, which was coded as six ordered categories in the original dataset. The number 1 corresponds to an eighth grade or lower education. The number 2 corresponds to those who have gotten to grade 12, but received no diploma. The third category is for those with a high school diploma, while the fourth category is those with a high school diploma, and additional non-academic training. The fifth category is those with some

college, but no degree, while the sixth category is those with bachelors and advanced degrees.

This study created separate dummies for each level of education.

This study also employs an age control, which was measured as a continuous variable. For use in the study, this was also broken down into quartiles, the first quartile ranges from 18-35, the second from 36-51, the third from 52-62, and the fourth containing people 63 and up. The median age in this sample is 48.93, with a standard deviation of 17.43.

This study also includes four race dummies, including Black, White, Asian, and Other. The sample is 73.0% White, 19.0% Black, 1.8% Asian, and about 9.0% other. Some respondents selected multiple races, so the total breakdown sums to more than 100%. White is used as the base value, and it should be noted that the weights used in all regressions correct for a slight oversampling of black voters – reducing the proportion of black people in the sample from 19% to 12%.

The study will also control for perception of the importance of voting – or the respondent’s sense of whether elections make elected officials more attentive to citizens. This was an ordinal variable, with four possible responses: “not much,” “some,” “a good deal,” and “can’t say.” Nearly 21% of respondents believe that elections have little impact on the government’s interest in citizens, while 48% believe elections have some effect, and 29% believe that elections have a “good deal” of influence. Only 0.2% of the sample couldn’t answer the question for any reason. This study collapsed these responses down into two categories: “yes” and “no,” with “not much” and “can’t say” in the “no” column, and “some” and “a great deal” in the “yes” column.

Lastly, the study uses three binary control variables, including gender, with a sample that is 51.89% female, with a standard deviation of 0.5; marital status, which has a mean of 0.498, and a

standard deviation of 0.5; and employment status, which has a mean of 0.524, and a standard deviation of 0.499.

Figure 2: Summary Statistics

VARIABLES	Mean	Standard Deviation
Fixed-Connection	3.879	(0.316)
Mobile Access	9469.1	(8403.5)
Educational Attainment is Less Than High School	0.0212	(0.144)
Has Some High School	0.104	(0.306)
High School Graduate	0.348	(0.476)
High School Plus	0.407	(0.491)
Has Some College	0.679	(0.467)
Has a Bachelor's Degree	0.988	(0.107)
Age	48.93	(17.43)
Female	0.518	(0.500)
Married	0.498	(0.500)
Employed	0.524	(0.499)
Income	2.677	(1.237)
Black	0.191	(0.393)
Asian	0.0182	(0.134)
Other Race	0.0861	(0.281)
Political Perception	.2915	(0.455)

Figure 3: Variable Descriptions and Values

Value	Fixed-Connection (Connections per 1,000 Households)	Mobile (Total Subscriptions)	Age	Income
1	0 -200	298-3,380	18-35	\$0 -\$16,999
2	200-400	2,446-6,083	36-51	\$17,000- \$34,999
3	400-600	6,274-12,725	51-62	\$35,000 -\$69,999
4	600-800	17,979-27,656	63+	\$70,000 -\$119,999,
5	800 and up			\$120,000 and up

METHODOLOGY

This paper uses a combination of Logit and OLS regressions to assess the relationship between fixed-connection broadband Internet access, mobile broadband access, and each proxy for civic engagement. Twelve regressions were run, two for each individual civic engagement variable, examining each key independent variable divided into quartiles and terciles, to look for relationships. This study opted to examine each measure of civic engagement individually rather than creating a new variable that is a matrix of the six measures due to econometric concerns arising from the strong differences in engagement rates across categories. This study weighted each regression in order to get nationally representative estimates.

The six models in use are detailed below:

Model 1:

Attended Church

$$= \beta_0 + \beta_1 \text{fixedconnect} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Attended Church

$$= \beta_0 + \beta_1 \text{mobile} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Model 2:

Attended Political Event

$$= \beta_0 + \beta_1 \text{fixedconnect} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Attended Political Event

$$= \beta_0 + \beta_1 \text{mobile} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Model 3:

Worked for Campaign

$$= \beta_0 + \beta_1 \text{fixedconnect} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Worked for Campaign

$$= \beta_0 + \beta_1 \text{mobile} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Model 4:

Registered to Vote

$$= \beta_0 + \beta_1 \text{fixedconnect} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} \\ + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Registered to Vote

$$= \beta_0 + \beta_1 \text{mobile} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} \\ + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Model 5:

$$\text{Voted} = \beta_0 + \beta_1 \text{fixedconnect} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} \\ + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

$$\text{Voted} = \beta_0 + \beta_1 \text{mobile} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} \\ + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Model 6:

Donated to a Campaign

$$= \beta_0 + \beta_1 \text{fixedconnect} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} \\ + \beta_7 \text{married} + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

Donated to a Campaign

$$= \beta_0 + \beta_1 \text{mobile} + \beta_2 \text{educ} + \beta_3 \text{inc} + \beta_4 \text{race} + \beta_5 \text{age} + \beta_6 \text{gender} + \beta_7 \text{married} \\ + \beta_8 \text{employed} + \beta_9 \text{political perception}$$

A number of sensitivity analyses were performed on these regressions with additional measures. This study tried controlling for region, with no discernible effect. It also tried employing age as a quadratic, with no dramatic change in effect. It also tried running the regressions without weights, to look for interesting variations. In the end, the results are not sensitive to changes in the model specification.

RESULTS

This study found results in line with previous literature, and in keeping with expectations. Fixed-connection broadband had stronger effects on measures of civic engagement than mobile broadband, though there were clear effects in some cases for mobile. There were statistically significant positive relationships between access to broadband and voting, donating to political campaigns, and attending church. Mixed results were found for voter registration, but concerns about the validity of the data made those results less convincing. Civic engagement activities that required an investment of considerable time, like volunteering, or attending political speeches were harder to pin down, yielding no significant results.

Church Attendance

The first OLS regression for model 1 yielded statistically significant results on the broadband term, demonstrating that those people in communities with greater access to broadband were more likely to attend church. An increase from the base to the lowest category of “broadband connectivity” was associated with a 33% increase in church attendance. The move up to the next tier of connectivity showed a 33% increase in church attendance, while the move to the highest level of connectivity showed a full 64% increase in church attendance. These results were highly statistically significant.

The second OLS regression for model 1 yielded statistically significant results in only one category of connectivity, and results just outside the acceptable range of significance for the highest tier. Church attendance, if a person moves from the lowest level of mobile connectivity to the second lowest is increased by 12%. Moving up one level of mobile connectivity, the likelihood of church attendance increased by 7.2%, though this is statistically significant only at

the 18.9% level, just outside of the 15% cutoff that is normally considered acceptable. Its proximity to the cutoff suggests consideration should be given to the results, as they may hint at a real relationship.

Overall, this study clearly shows that access to fixed-connection broadband is strongly associated with higher levels of church attendance, while mobile broadband has a weaker, but still positive relationship with church attendance. A number of explanations could be found for this, including the fact that greater access to information could lead to people more easily finding denominations or church communities that suit them.

Attending Political Events

The first Logit regression for model 2, looking at the effect of fixed-connection broadband on attendance of political events, yielded no statistically significant results. The regression demonstrated no significant relationship between access to fixed-connection broadband and the likelihood that a person would attend a political rally or event.

Likewise, the second Logit regression for model 2 shows no statistically significant results. There appears to be no significant effect on the likelihood of attending a political rally or event when a person gains access to mobile broadband. While these results were disappointing, this study had previously noted that less than 6% of the sample reported having attended a political event of any kind, making it unlikely that significance of any kind could be established, with such a small sample of affirmative answers.

Volunteering for a Campaign

Model 3 also yielded no statistically significant results for either fixed-connection Internet or mobile access in the two Logit regressions. This study saw no statistically significant effect on

the likelihood that a person would work for a politician or political campaign based on whether they had access to either fixed-connection broadband or mobile broadband. Similar to attendance at political events, less than 5% of the sample replied in the affirmative to this question. It is therefore not surprising that there were no statistically significant results in any direction.

Registering to Vote

The Logit regressions for model 4 yield mixed results when looking at the relationship between access to broadband Internet and the likelihood of registering to vote. There was no statistically significant association between fixed-connection Internet and the likelihood of registering to vote, but there were, however, statistically significant results for two of the three categories of mobile connection, with the third just outside conventional cutoffs. While these results are intriguing, it should be noted that 91.7% of the sample reported registering to vote. Since the national average for registration, as reported by the CPS, has hovered around 70% for the past 20 years, this seems like misreporting or biased sampling. Since the validity of the data is in doubt, this study would hesitate to report results from this particular question without verifying those registration numbers independently.

Voting

The first Logit regression for model 5, using fixed-connection broadband, yielded significant results on the fixed-connection broadband term. This suggests that fixed-connection broadband Internet access is associated with increased odds that a person would vote. In fact, it appears from this regression that states with the second lowest quartile of broadband connections per 1,000 households had 53% better odds of voting than states in the lowest quartile. Those in the third tier of connectivity (between 600 and 700 connections per 1,000 households) had 49%

better odds of voting than the base category of lowest connectivity. The top category of connectivity had 38% better odds of voting than the base category.

The second regression for model 5, using mobile broadband access, yielded statistically significant results on the mobile broadband term when mobile broadband broken down into terciles is used. Employing the same control variables as the first regression, this study found that the move from the lowest category of mobile broadband access to the middle category of broadband access was associated with a 23% increase in likelihood of voting. The move to the highest category of mobile broadband access is also statistically significant, but appears to reduce the odds of a person voting.

Once again, this study saw a stronger positive association between fixed-connection broadband access and voting than between mobile broadband and voting. This could be explained by a number of things: the type of media people are exposed to on home computers vs. mobile devices, the lag that political campaigns have shown in making their engagement tools mobile-optimized, or other, less measurable characteristics of that differ between users of fixed vs. mobile Internet.

Donating to a Political Campaign

The first regression for model 6 yielded statistically significant results, making it clear that access to fixed-connection broadband was associated with higher odds of a person donating to a political campaign. The move from the lowest category of fixed-connection broadband access to the second lowest category is associated with a 39% increase in the odds that a person would donate to a political campaign. The move to the next highest tier of connectivity is associated with a 27% increase in the odds that a person would donate. The move to the highest level of

connectivity is associated with a 37% increase in the odds that a person would donate to a campaign.

The second regression for model 6 yields statistically significant results only in the middle category. We can see that the move from the second lowest category of mobile access to the third lowest (using mobile connectivity in quartiles) is associated with a statistically significant increase in likelihood of voting of 30.9%.

In this last model, the pattern continues: strong positive relationships between fixed-connection access and donation rates, and slightly weaker, though still positive relationships between mobile access and donating. An explanation among campaign workers for this phenomenon is that people are more likely to donate online these days. This often happens after having an experience, like viewing a video, or signing a petition. Those activities are more difficult or less visually appealing on mobile devices, and are therefore less likely to happen in that digital environment. Furthermore, concerns about public Wi-Fi networks, and frustration with entering credit card information on a small phone screen might work to further depress online donation rates from mobile devices.

This study found results in keeping with received wisdom: that access to more information from a diversity of sources is associated with increases in voting, donating, and registering, as well as associated with higher church attendance. This study's attempt to search for additional proxies for civic engagement bore little fruit, with less than meaningful results from either of the two new measure of engagement. Full breakdowns of odds ratios and coefficients for the three significant relationships are detailed in Figures 4 and 5 below.

Figure 4. Estimates of Probabilities in the Fixed-Connection Model

	Logit	OLS	Logit
VARIABLES	Voted	Church Attendance	Donated
Fixed-Connection Access‡ 25 th -50 th percentile	1.530*** (0.205)	0.343*** (0.0586)	1.396** (0.230)
Fixed-Connection Access 50-75 th percentile	1.494*** (0.204)	0.335*** (0.0591)	1.276 (0.220)
Fixed-Connection Access top 25%	1.387** (0.184)	0.639*** (0.0611)	1.370* (0.239)
High School Graduate‡	0.570*** (0.124)	0.430*** (0.0948)	0.607* (0.161)
High School Plus	0.831 (0.186)	-0.233** (0.0979)	0.739 (0.190)
Has Some College	0.603*** (0.0863)	0.125** (0.0587)	0.738** (0.104)
Has a Bachelor's Degree	2.349* (1.040)	-0.651*** (0.199)	1.150 (0.507)
Black‡	2.150*** (0.344)	-0.535*** (0.0642)	1.836*** (0.300)
Asian	0.538* (0.177)	0.0359 (0.148)	1.382 (0.529)
Other Race	0.687** (0.122)	-0.0381 (0.0864)	1.330 (0.302)
Age Quartile 2‡	1.729*** (0.218)	-0.0953* (0.0568)	1.357 (0.264)
Age Quartile 3	2.353*** (0.305)	-0.140** (0.0598)	2.296*** (0.422)
Age Quartile 4	5.286*** (0.856)	-0.450*** (0.0631)	4.165*** (0.788)
Female	1.150 (0.112)	-0.265*** (0.0421)	0.813* (0.0932)
Income Quartile 2‡	1.534*** (0.179)	-0.0163 (0.0518)	1.321* (0.210)
Income Quartile 3	1.929*** (0.284)	0.00555 (0.0621)	1.910*** (0.334)
Income Quartile 4	2.524*** (0.727)	-0.117 (0.108)	2.837*** (0.817)
Married	1.291**	-0.396***	1.136

	(0.137)	(0.0455)	(0.145)
Employed	1.007	0.0401	0.765*
	(0.107)	(0.0476)	(0.109)
Political Perception	1.391***	-0.173***	1.329**
	(0.160)	(0.0467)	(0.163)
Constant	0.481	4.441***	0.0378***
	(0.225)	(0.211)	(0.0192)
Observations	5,488	5,890	5,486
R-squared		0.071	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

‡Base category omitted

Figure 5. Estimates of Probabilities in the Mobile Model

	Logit Voted	OLS Attended Church	Logit Donated
Mobile Access 25 th -50 th percentile‡	1.239*	0.120**	1.195
	(0.141)	(0.0483)	(0.191)
Mobile Access 50 th -75 th percentile	0.845	0.0723	1.309*
	(0.0993)	(0.0551)	(0.210)
Mobile Access Top 25%			1.229
			(0.216)
High School Graduate ‡	0.585**	0.447***	0.597*
	(0.126)	(0.0955)	(0.160)
High School Plus	0.826	-0.244**	0.751
	(0.183)	(0.0987)	(0.194)
Has Some College	0.618***	0.111*	0.740**
	(0.0874)	(0.0592)	(0.104)
Has a Bachelor's Degree	2.414*	-0.614***	1.185
	(1.087)	(0.200)	(0.516)
Black‡		0.603***	1.768***
		(0.0645)	(0.286)
Asian		0.194	1.436
		(0.149)	(0.546)
Other Race		-0.000226	1.339
		(0.0872)	(0.306)

Age Quartile 2‡	1.728***	-0.0858	1.349
	(0.214)	(0.0573)	(0.261)
Age Quartile 3	2.344***	-0.139**	2.278***
	(0.298)	(0.0604)	(0.421)
Age Quartile 4	5.150***	-0.442***	4.156***
	(0.819)	(0.0636)	(0.788)
Female	1.136	-0.275***	0.810*
	(0.109)	(0.0424)	(0.0933)
Income Quartile 2‡	1.505***	0.00176	1.325*
	(0.171)	(0.0522)	(0.210)
Income Quartile 3	1.864***	0.0642	1.934***
	(0.266)	(0.0624)	(0.338)
Income Quartile 4	2.647***	-0.0276	2.897***
	(0.762)	(0.109)	(0.852)
Married	1.178	-0.420***	1.135
	(0.123)	(0.0459)	(0.144)
Employed	1.015	0.0367	0.774*
	(0.107)	(0.0481)	(0.111)
Political Perception		-0.157***	1.328**
		(0.0470)	(0.163)
Constant	0.985	4.648***	0.0391***
	(0.443)	(0.212)	(0.0196)
Observations	5,510	5,890	5,486
R-squared		0.054	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

‡Base category omitted

POLICY IMPLICATIONS AND CONCLUSIONS

This study found a clear relationship between broadband Internet access and civic engagement, using publicly available data and a combination of Logit and OLS regressions to hold demographic characteristics constant. In a discussion of these findings this paper will first touch on the weaknesses in the model, then discuss the suggestions these imply for further research, and will finally conclude with the implications these findings have for policy-makers.

Weaknesses in the model

There are a number of weaknesses in this model, some of which could be corrected with better data collection, and some of which are inherent to a model of this type. The first weakness is in the variables used as civic engagement indicators. While voting and political activity have long been used as proxies for civic engagement, they only account for a small amount of the activities people might engage in to enrich their community and build social trust. Non-political activities like volunteering at schools or homeless shelters, food pantries or after-school programs are not measured in these variables. Belonging to a homeowner's association, a parent support group, or a group of neighbors petitioning authorities for better bike lanes are also not captured. While this study tried to control for the value respondents placed on the electoral process, so as to account for people who don't believe in voting, it did not capture the many trust-building community-enriching activities outside of government.

Most worryingly, this study did not address the way that people are using technology to get involved in their communities. With the growth of online organizing tools, many community advocacy activities no longer need the in-person infrastructure they once did. While respondents may not have attended a political rally in person, they could have watched it live-streaming on

the Internet. The evolution of online tools has allowed people to pick and choose the way they engage in their communities, giving them more information about their options, but also more opportunities to lend their unique skillset to a particular cause, by tailoring their volunteer experience. New organizations like VolunteerMatch have sprung up in this space in recent years, using the Internet to connect volunteers to opportunities in causes that matter to them, using the more advanced skills they possess. Advocates for this more targeted approach to civic engagement have argued that this allows people to have a greater impact during their volunteer hours, which leaves them satisfied, and more deeply invested in the organization or cause. Some even say that these increases in efficiency might lead to fewer hours of volunteerism, but better outcomes.

These weaknesses in the civic engagement proxies arise for the most part from a lack of usable data. The development of increasingly sophisticated online organizing tools has been a mostly recent phenomenon, and has been measured by relatively few organizations. Civic engagement has long been thought of in a particular mold, and the electoral innovations of 2008 have just begun to illuminate other models. Groups specializing in measuring civic engagement are watching the model evolve, trying to anticipate the type of analysis we will want ten years from now, as they formulate their questions today.

A second clear weakness in the model springing from the data is the un-measurable overlap between fixed-connection broadband subscribers and mobile broadband subscribers. Ideally, to measure the relationship between those connections and civic engagement, this study would be able to separate the sample into those with fixe-connection access, those with mobile broadband access, and those with both. The nature of the FCC's data does not allow for that level of detail,

leaving it unclear who our mobile-only subscribers are, who our all-of-the-above subscribers are, and where the effects might bleed over into different groups.

The last clear weakness in the model this study will address appeared to be the mismatching levels of the data. If a goal of the study was to consider the plight of the under-connected, who are split between urban and rural areas, it initially seemed unfortunate that data about mobile subscriptions were not available in units any smaller than the state level. To collapse the fixed-connection data to the state level to match the mobile data seemed a waste. The study lost the specificity of the census-tract-level variation, and a state's connectivity average could be dramatically influenced by the presence of a single larger city, or large uninhabited areas, seemingly skewing results. One might have been inclined to get the data at the person level, for maximum granularity. However, that data would have been highly endogenous with the key covariate that we were unable to include – that un-measurable quality that makes people more likely to vote, and more likely to purchase fixed-connection Internet, or a mobile broadband subscription. So this study found that comparing connectivity at the state level allowed the state to act as almost an instrumental variable. The state is a measure of Internet access that doesn't correlate with the unobservable propensity of the person to become civically engaged, in theory. While one could argue that people could get greater connection in their state if they demanded it, we have found that is not always the case. New Hampshire residents have long petitioned telecommunications firms to extend broadband outside of central cities, but have found that geographic and market forces have stood in their way. It seems unlikely that many individuals would choose the state in which they reside based on Internet access, either. This weakness then,

appears to be a strength in the end, balancing out the last perceived weakness – the inability of the study to quantify the un-observables contained in the error term.

Suggestions for further research

The weaknesses in the available data and the specification of the model lead to some clear suggestions for further research. As this study mentioned, organizations dedicated to measuring civic engagement would be well-served by expanding their definitions, and including questions about Internet usage and social media engagement in their surveys. The Pew Research Center's Internet and American Life Project has by far the most sophisticated surveys in the field asking these questions. Their reliance on self-reported broadband access, however, leaves too many questions about the reliability of those measures. Since the FCC re-defines broadband at regular intervals, we can be relatively certain that the definition might vary between each individual surveyed. This study would advocate for larger longitudinal surveys to adopt some of Pew's avenue of questioning, at a level that could be used in conjunction with verified connection data.

This study would also urge the FCC to consider revisions to the Form 477 collection process. The Form 477 was established in 2000 to provide the Commission with data that was not collected elsewhere, in order to fulfill their mission of developing and evaluating telecommunication policy. The Form 477 Modernization Order, released in 2013, was intended to standardize some aspects of data collection, bringing the manner of mobile subscription data collection closer to that of fixed-connection collection. This study applauds the goal of standardizing the collection of such essential data, and managing all in one place. It would further argue that the FCC should consider adding a layer of granularity to this data, and trying to determine the overlap of those two subscriber groups. A number of notices of proposed

rulemakings have sought public input on whether consumer surveys would help fill in the gaps in the data, and this study would argue very much in the affirmative.

The conclusions about the different effects of broadband Internet and mobile connections also suggest opportunities for further research. There is room for more investigation into the different ways that people interact with information on a home network vs. mobile devices. There is also a good deal that could be learned from the way people think of the two different services – whether they see them as interchangeable, or supplemental. Lastly, there are important questions about the way different demographic groups conceptualize and interact with the two services. While some groups might use fixed-connection broadband as an information service, others might see it as strictly a form of entertainment. In order to ensure the right controls in the model, it would be helpful to see the patterns of use more plainly.

Policy Implications

This study shows that fixed connection Internet tends to encourage civic engagement to a degree that mobile access does not, in all cases. This implies that both the physical presence of the connection and the application of that connection are important. In addition to clear arguments for better data collection policies on the parts of service providers, the FCC, the Census Bureau, and other interested research organizations, these findings show a need for better programming aimed at closing the digital divide. Since the findings make it clear that mobile broadband is not a replacement for fixed-connection broadband, there is an argument for better programming to go along with mobile connections. The three groups who make up the majority of those who are not online are the urban poor, people in rural areas, and older people. Each group likely would require a different type of encouragement to adopt the internet, and to use it

as a supplement to get more deeply involved in their communities. Efforts to encourage older citizens to get online will likely not be successful if they are focused solely on mobile adoption. Some of the urban poor lack fixed-connection access because they move too frequently for it to be worth the trouble, but with better outreach on their mobile devices, could perhaps engage in some of the same activities that they might on fixed-connections. Rural residents might face huge cost barriers to establishing fixed connections, but could perhaps use their mobile devices to form the sort of affinity groups necessary to advocate for public private partnerships to bring subsidized fiber lines to their communities.

This study found that access to information through broadband internet has a positive effect on communities, but that not all access is the same. There is a strong equity argument for getting everyone online, and providing them with the tools necessary to know what is happening in their communities, and how to speak out. It is clear that democracy only works when all citizens have a voice, and increasing connectivity, adoption, and digital literacy is our best way to ensure that all voices are heard.

Figure 6. Distribution of Fixed-Connection Broadband by State

HIGH-SPEED BROADBAND CONNECTION LEVELS ACROSS THE US

Data collected by the FCC in 2012 indicates levels of high-speed broadband connectivity vary widely across states in the US. Even states with similar demographics, like Vermont and New Hampshire, have different mixes of levels due to local regulation and business practices.

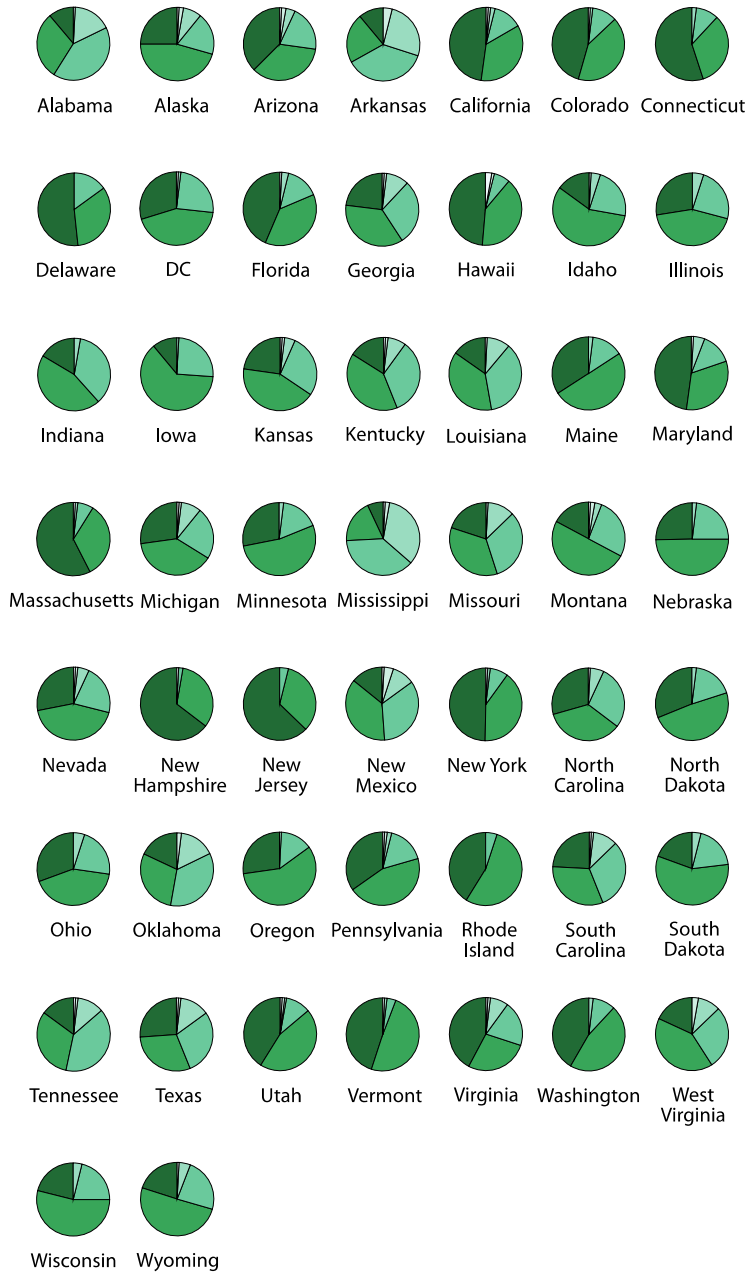
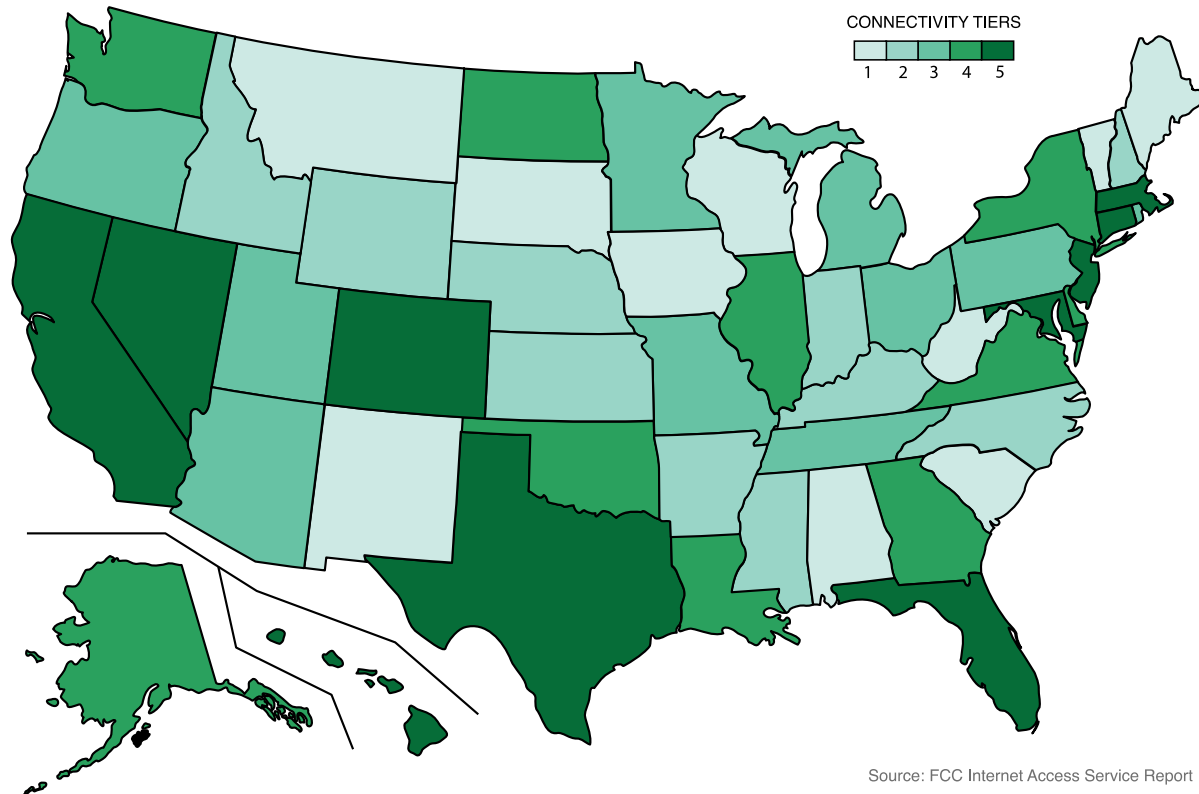


Figure 7. Mobile Broadband Subscriptions by State

MOBILE BROADBAND CONNECTIVITY, 2012

In 2012, FCC data showed the variation in mobile broadband subscriptions by state, from the lowest ratio of subscriptions per person, at tier 1, to the highest ratio at tier 5.



BIBLIOGRAPHY

Agre, P. E. (2002). Real-Time Politics: The Internet and the Political Process. *The Information Society* 18(5), 311-331.

American Psychological Association. Civic Engagement. n.d. Retrieved from <http://www.apa.org/education/undergrad/civic-engagement.aspx>

Annenberg Digital Future Project. *Special Report: America at the Digital Turning Point*. (2012). Retrieved from: http://annenberg.usc.edu/News%20and%20Events/News/~media/PDFs/CDF_DigitalReport.aspx

Annenberg Digital Future Project. *Surveying the Digital Future: Year Eleven*. (2013) Retrieved from <http://www.digitalcenter.org/wp-content/uploads/2013/06/2013-Report.pdf>

Beyerlein, K., & Hipp, J. R. (2006). From pews to participation: The effect of congregation activity and context on bridging civic engagement. *Social Problems*, 53(1), 97-117. Retrieved from <http://search.proquest.com/docview/216928256?accountid=11091>

Brodkin, J. (2014) 16-cent E-rate phone hike will fund \$1.5 billion in school broadband. *Ars Technica*. Retrieved from <http://arstechnica.com/business/2014/11/16-cent-e-rate-phone-fee-hike-will-fund-1-5-billion-in-school-broadband/>

Congressional Research Service. E-Rate for Schools: Background on Telecommunications Discounts Through the Universal Service Fund (98-604 EPW) by James B. Steadman and Patricia Osorio-O'Dea. (2001).

Federal Communications Commission (FCC). *National Broadband Plan: Connecting America*. (2010). Retrieved from. <http://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf>

Flanagan, C. (2003). Developmental roots of political engagement. *PS, Political Science & Politics*, 36(2), 257-261. Retrieved from <http://search.proquest.com/docview/224926524?accountid=11091>

Jennings, M. K., & Stoker, L. (2004). Social trust and civic engagement across time and generations. *Acta Politica*, 39(4), 342-379. Retrieved from <http://search.proquest.com/docview/217162432?accountid=11091>

Kwak, N., Shah, D. V., & Holbert, R. L. (2004). Connecting, trusting, and participating: The direct and interactive effects of social associations. *Political Research Quarterly*, 57(4), 643-652. Retrieved from <http://search.proquest.com/docview/215315365?accountid=11091>

Litan, R. E., and A. M. Rivlin. 2001. Projecting the Economic Impact of the Internet. *American Economic Review*, 91(2), 313-317.

Madden, M. & L. Rainie. (2003). America's Online Pursuits: The changing picture of who's online. *Pew Research Internet Project*. Retrieved from <http://www.pewInternet.org/2003/12/22/americas-online-pursuits/>

National Conference on Citizenship (2011). Civic Health and Unemployment: Can Engagement Strengthen the Economy? Retrieved from <http://www.ncoc.net/unemployment>

National Telecommunications and Information Administration (NTIA). *Digital Nation: Expanding Internet Usage*. (February 2011), Retrieved from http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_Internet_use_at_home_11092011.pdf

Pariser, E. (2011). *The Filter Bubble: What the Internet is Hiding From You*. New York, NY: Penguin Press.

Paxton, P. (2002). Social Capital and Democracy: An Interdependent Relationship. *American Sociological Review*, 67(2), 254-277.

Sunshine Hillygus, D. (2005). The Missing Link: Exploring the relationship between higher education and political engagement. *Political Behavior*, 27(1), 25-47.
doi:<http://dx.doi.org/10.1007/s11109-005-3075-8>

Zickuhr, K. (2013). Who's Not Online and Why: Main Report. *Pew Research Internet Project*. Retrieved from <http://www.pewInternet.org/2013/09/25/main-report-2/>

Putnam, R. D. (1995) Bowling Alone: America's Declining Social Capital. *Journal of Democracy*, 6(1) 65-78.

Singleton, M. (2015) The FCC Has Changed the Definition of Broadband. *The Verge*. Retrieved from <http://www.theverge.com/2015/1/29/7932653/fcc-changed-definition-broadband-25mbps>

Smidt, C. (1999). Religion and civic engagement: A comparative analysis. *Annals of the American Academy of Political and Social Science*, 565, 176-192. Retrieved from <http://search.proquest.com/docview/219541494?accountid=11091>

Smith, A. (2013). Civic Engagement in the Digital Age. Pew Research Center, Washington, D.C. Retrieved from http://www.pewInternet.org/files/old-media/Files/Reports/2013/PIP_CivicEngagementintheDigitalAge.pdf

Sunstein, C. (2001). *Republic.com*. Princeton, NJ: Princeton University Press.